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STUDIES IN ENLISTED SUBMARINER MOTIVATION I: Some Etiological  
Factors Related to Devolunteering of Submarine School Candidates

by

Ernest M. Noddin

Bureau of Medicine and Surgery, Navy Department  
Research Work Unit MF51.524.004-9009DA5K.07

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## SUMMARY PAGE

### THE PROBLEM

The purpose of this study was to identify and, if possible, explain the major etiological patterns for enlisted submariners "devolunteering" from submarine duty.

### FINDINGS

The reasons for devolunteering were found to vary across pay grade, type of sea duty, and whether qualified or not qualified as a submariner. Factors related to habitability were most frequently related to the diesel submariners' devolunteering, while family problems accounted for many of the "devols" with higher pay grades, though the perceived dangers of submarine duty were also involved with this group's devolunteering.

### APPLICATION

This study delineates some of the major factors causally related to devolunteering from the submarine service and suggests possible means of reducing the incidence of loss of enlisted men subsequent to Submarine School graduation.

### ADMINISTRATIVE INFORMATION

This investigation was conducted as a part of Bureau of Medicine and Surgery Research Work Unit MF51.524.004-9009DA5K, Psychophysiological Effect of Prolonged Exposure to the Environment of the Submariner and Diver. The present report is No. 7 on this Work Unit. The manuscript was approved for publication on 2 March 1972 and designated as Naval Submarine Medical Research Laboratory Report No. 703.

## ABSTRACT

Questionnaire data pertaining to the circumstances surrounding a submarine crewmember's decision to devolunteer were collected from 101 enlisted men following Submarine School graduation. Thirteen classes of motives resulted from a content analysis of these data. The four major motivational categories in descending order of incidence were: Habitability factors, Motivation deficiencies, Maladjustive indices, and Family Problems. Habitability factors and motivation deficiencies account for most of the devolunteering of the lower paygrade men assigned to the diesel submarine fleet. In contrast, the higher-rated, nuclear-trained submariners appeared to have devolunteered largely because of problems related to family adjustment, and to a lesser extent, because of the perceived dangers of submarine duty. Across all subgroups within this sample, 25% or more apparently had some type of maladjustive trend associated with and probably causally related to the decision to devolunteer. Several approaches counteractive to the major causes of devolunteering delineated by this study were presented.



## STUDIES IN ENLISTED SUBMARINER MOTIVATION I: Some Etiological Factors Related to Devolunteering of Submarine School Graduates

### INTRODUCTION

The submarine service has traditionally been an elite volunteer service. In order to be accepted for the submarine service a volunteer must meet one of the following combined Basic Battery Test score criterion:  $GCT + ARI = 100$ ,  $GCT + Mech = 100$ , or  $ARI + Mech = 100$ . Since, in theory, the mean combined score is 100, this cut-off point limits acceptance for the submarine service to the upper half of the aptitude test score distributions for enlisted men. In actuality, the mean GCT (in T-score Form) of Submarine School graduates presently in the submarine service is approximately 60 while the mean Mech is about 57, yielding a combined mean of 117 (Noddin, 1969). Thus, the majority of the enlisted men currently being accepted for submarine training come from the upper 1/3 of the aptitude distribution for the Navy as a whole. Further serving to reduce the variance or individual differences of the enlisted input into Submarine School are the effects of the imposition of additional rather stringent physical and psychological acceptance criteria. The net result of implementation of these standards is to make the submarine population much more homogeneous than most specialized groups in the Navy.

Previous studies have dealt with reasons for volunteering for the submarine service (Youniss, 1956), along with reasons for being disqualified from this branch of the service

(Kinsey & Weybrew, 1953; King 1957; Weybrew & Noddin, 1969). These studies, however, have failed to separate the groups into those who had in fact freely devolunteered from those who had been disqualified either with or without the man's concurrence. It may not, for example, be obvious that a submariner candidate may "passively devolunteer" simply by failing to demonstrate sufficient effort to meet the requirements for qualification, or in some cases, requalification for the "SS" designation.

Unlike the previously mentioned studies, therefore, the present study focuses upon the motivational patterns underlying a submarine crew-member's actively seeking to devolunteer from the submarine service. In most cases, this process of devolunteering is initiated by the man himself by means of a written request to devolunteer accompanied by a letter containing his own stated reason or reasons for devolunteering. In brief, this study is based upon an analysis of the content of a sizable sample of these devolunteer requests and letters provided by the staff of the Basic Enlisted Submarine School<sup>1</sup>. The timeliness of this study

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<sup>1</sup>We are indebted to Chief Petty Officer Carmack of the Submarine School Staff for arranging access to the devolunteer materials and to LCDR R. D. HARTFELDER, Director, Basic Submarine Enlisted Division, for permission to conduct the content analysis of this information.

is evidenced by the fact that between the years 1967 and 1968 there was a three-fold increase in non-volunteers at the Submarine School level (Official Letter, 1969). Since this time span approximates the period during which the data for this present study were collected, it seemed reasonable that identification of some of the causal factors associated with devolunteering subsequent to Submarine School graduation would provide suggestions as to possible administrative procedures which, if implemented, may improve the "submarine retention" situation both at the Submarine School level and beyond.

## METHODS AND PROCEDURES

### Subjects

The population sample for this study consisted of 107 enlisted men serving aboard submarines of the Atlantic Fleet. The pay grades ranged from E-2 to E-7, the rating distributions being representative of submarine crews in general. The time served aboard submarines ranged from a few weeks to over 15 years. More than two-thirds of the sample were not qualified submariners (SS) at the time the disqualification proceedings were initiated. They had served on all three classes of submarines: SS or diesel, SSN or fast-attack, and SSBN or missile-carrying nuclear-powered submarines. More than half were serving aboard nuclear-powered submarines at the time the "disqualification" action was taken. In no way is this sample of enlisted men to be considered a random sample of "devolunteers", since, in effect, the group contained only those men who were assigned to submarines in the

Atlantic Fleet, and who had submitted a letter requesting disqualification from the service during this time span from 1968 to 1970.

### Procedure

The Naval Submarine School at Groton, CT continuously receives data pertaining to the disqualification of submariners assigned to the Atlantic Fleet. These data typically include medical, as well as psychological and administrative information on each devolunteer or disqualified crewmember.

The total sample used in this study was comprised of information pertaining to 431 disqualified individuals, of which 107 were "devolunteers." A sorting technique involving four "expert" judges (staff psychologists) was used to categorize the "reasons for devolunteering" as ascertained from an assessment of the contents of the materials describing each man's situation. Only those subjects were retained in the sample whose reasons for devolunteering were agreed upon by at least three out of the four judges. This sorting and elimination procedure resulted in 13 categories of "reasons for devolunteering." Only 6 men were eliminated from the sample because of insufficient inter-judge agreement, or in some instances, because of a sparsity of the subject sample mentioning a given category.

## RESULTS

It may be recalled that a modified Q-Technique had been applied to the problem of categorization of the variety of reasons or factors indicated



by the men as major causes of their devolunteering from submarine service. Since the results of this content analysis was central to the main purpose of this study, a brief summarization of each of the 13 classes of processes follows.

### Categories of Motives for Devolunteering

Motivational Deficiencies (A)\*. For the non-qualified subgroup this category subsumed for the most part responses having to do with insufficient and/or inappropriate motivation necessary for the sustained effort required for all submariner candidates to construct the "systems" workbook, complete the compartment and systems "check out" and pass the practical examination - all requisites for submariner qualification and the authority to wear the much-prized dolphins. For the qualified submariners in the sample, the dynamics or causes of devolunteering were similarly motivational in nature, though the total situation in which the motivational decrement occurred was different, most certainly for the nuclear-trained man. The differences appeared to be associated with the requirement that a nuclear submariner must requalify whenever he is reassigned to a different submarine. An excerpt from one devolunteer letter makes the appropriate point, "I have lost all desire to requalify onboard this boat."

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*\*The upper-case letters in parenthesis, where they appear henceforth in the text, will refer to the 13 motivational classes briefly described in this section of the paper.*

### Dangers of Submarine Duty (B).

Most of the statements included in this category refer to a diffuse, poorly-localized general apprehension associated with the submarine environment. For example, a qualified submariner with a history of six years' active submarine duty states that his major reasons for devolunteering were as follows: "I have come to the conclusion that submarines are becoming more dangerous with each day. Some of the events of which I speak are the fatal accidents that befell both the USS THRESHER and USS SCORPION. Both submarines have been lost with all hands and without leaving behind conclusive evidence to use in preventing future submarine disasters." Also included are statements referring to more specific fears, e.g., fear of being underwater. One devolunteer stated, "I no longer feel safe on submarines and the thought of going back underwater is frightening."

Habitability (C). Some of the devolunteer statements were indicative of generalized negative attitudes toward the submarine situation as a whole. For example, one man admitted an "instantaneous dislike" which, with time, became "a deeper hatred for the submariners' way of life." Other, more specific aspects of the submariner's environment which were indicated as being annoying were: close living conditions, restricted working conditions, extremely uncomfortable conditions, and living conditions substandard and unhealthy both mentally and physically. Typical statements assigned to the Habitability category (C) were: (a) "too confined

space in which to live, (b) being closed in for long periods of time, (c) no sizable locker space, (d) no personal bunk."

In short, this category subsumes those motives associated largely with the confinement and isolation, the atmosphere, and the personal inconveniences resulting therefrom.

Workload (D). One rather commonly held belief among submariners generally is that the major complaint of submariners who leave this branch of the service had to do with the arduous work assignments, at times in excess of 15 hours per day. A related problem pertained to the effects of protracted deployment periods at sea.

Maladjustive Symptoms (E). Included in this category are a variety of responses ranging from transient signs of frustration and discomfort through somewhat morbid phobias and depressions associated with restricted space and the fear of water depth to full-developed decompensatory psychiatric symptoms. The criterion for inclusion in this class of motives was that the symptomatology was sufficiently intense to cause the man himself to notice his discomfort, and for some, to become aware of performance decrements both on and off duty. Thus generalized emotional symptomatology such as tension, anxiety, depression, sleep problems, and sea-sickness, were included. Some of the devolunteer's statements serve as examples of this classification: "I don't believe I could sanely last in submarines for too much longer. I've lain awake many hours at night with the feeling that the walls

were closing in on me." "I have a fear of being at sea that causes me to be unable to function as I feel I should." "I have experienced an 'up-tight' feeling which causes me to become very depressed."

Attitudes Toward the Nuclear Power Program (F). Referring to a class of motivational processes, the term attitudes as used in this context has the connotation of a predisposition to respond favorably or unfavorably toward the object(s) or concept(s) with which the attitude is associated. Moreover, the concept "attitude" is closely related to the notion of "value" which was defined in an earlier report, "the concept value as a descriptive aspect of personality places culturally defined goals or behaviors on a good/bad, relevant/irrelevant or approval/disapproval continuum." (Hester & Weybrew, 1969). For the most part this category includes statements which were interpreted as evidence of negative (unfavorable) attitudes toward the Navy, or toward the submarine service in general, or, in still other cases, specifically toward the nuclear power program as a whole. An excerpt from the devolunteer letter of a chief petty officer included in the present sample serves to illustrate the content of this category: "I no longer possess the motivation and dedication required of the Nuclear Power Program." Further, considering the loss of two-nuclear powered submarines in recent years and the high turnover of inexperienced personnel, I feel that the risks involved in submarine duty are excessive."

Non-Submarine Interests (G). Interests are rather enduring motives, culturally-based, which often cause conflicts in on-going behavior in a given situation. This class therefore includes devolunteers whose major reason appears to be conflicting interest patterns most often associated with other Navy programs not directly associated with the submarine service.

Family Problems (H). This is a catch-all category which included any problems related to submarine duty as it affects the integrity of the man's family. Kinds of problems found in the devolunteer letters and included in this class are illustrated by quotations from the letters themselves. "I am at present and have been for the past year separated from my family. The situation has continued to deteriorate and will continue to do so as long as we are living apart. I have at this time the opportunity to stabilize my family situation given the time to be with them." "My wife has suffered through numerous physical and mental problems. Several personal problems encountered by her during my absence resulted in a near nervous breakdown and a miscarriage of our first child." "My family life is being affected because I take my tensions home and they are the cause of frequent disagreements. I do not feel that staying on submarine duty is worth causing family separation due to a continuation of past occurrences." "My second reason for no longer being a volunteer for submarines is my mother's health. She worries a lot and gets very nervous when I am on a submarine. Her health is more important to me than submarine duty." "The basic

nature of my problem is the continuous and worsening nervous and emotional condition of my wife, which has in turn affected me to the extent that I am very hesitant to attempt many maintenance and operational duties required by my rate and station for fear of personal and equipment safety." "To get right down to it she has told me in so few words that either I get out of submarines or she lives with her parents."

Deployment (I). The devolunteer letters included here contained one or more statements suggesting some degree of disaffection for any kind of submarine sea duty.

Status Incongruence (J). Individuals falling within this category were not satisfied with their status as a "non qual" (not qualified), were not working at a job they had been trained for, or were assigned a job they considered was below their capabilities.

Interpersonal Problems (K). The reasons for volunteering which stated or implied varying degrees of disaccord either within enlisted subgroups or between enlisted men and officers were included in this motivational class. Unsatisfactory personal relations either with peers or seniors were the devolunteer reasons within this category.

Pacifist Attitudes (L). Strong opposition to the use of nuclear weapons or negative attitudes toward being part of a weapons system describe the devolunteer reasons included within this category, as



illustrated by the following quotations cited here as examples: "I am requesting disqualification for submarine duty on the grounds that I am against the use of weapons. Nuclear weapons in particular." "I am plagued by conscience due to the fact that I am serving aboard a warship such as a submarine." "My personal feelings strongly and sincerely discourage me from serving aboard a ship capable of carrying nuclear weapons used against population centers."

Other General Classes of Motives for Devolunteering (M). The remaining motivational classes which could not be subsumed within any of the twelve groupings described above were included in this category. For example, one man stated that he joined the Navy to see the world and became very dissatisfied with the amount and kind of travelling afforded him as a submariner.

Comparison of Motivational Patterns of Qualified and Non-Qualified Devolunteers

To become a qualified submariner and wear the "dolphins" it is required that the submariner candidate acquire a thorough working knowledge of a number of the systems and subsystems necessary to propel and navigate the submarine and to fire its torpedoes and missiles. As a rule, although this may vary from ship to ship, the several subject matter areas (hydraulic and air revitalization for example) are "covered" in rather rigid time frames. Should a candidate fall behind in his schedule, he is deprived of many of his privileges. For example he may be deprived of or at least restricted in terms of liberty

privileges as well as opportunities to attend ship movies and other recreational events. In addition, there is usually no small amount of social pressure applied by other crew members to the candidate to become qualified within a finite time span, usually about 12-15 months, as a maximum. On many submarines the "non qual" is afforded very little status. Moreover, in the event that a qualified man is transferred to a new submarine, he must again learn or re-learn all the systems. Whereas, the requalification as compared to the initial qualification procedure is less arduous in some aspects, nonetheless, in both of the above situations it is possible for both qualified and non-qualified men alike to become discouraged, often with a significant drop in the intensity of the motivation to qualify being one of the major results.

As stated earlier, about one third of the subject sample were qualified submariners (SS). The first question to be answered from the data therefore pertained to the possibility that different motivational configurations would describe the SS -- designated man who had devolunteered as compared to the non-qualified man in similar circumstances. Table I contains percentage frequency distributions for these two subgroups and for the total sample as well.

Looking first within each group for relative significance of these motivational categories, it is seen that apprehension regarding the dangers of submarine duty (B)\*, family problems

*\*Henceforth upper case letters in parenthesis will refer to the motivational classes depicted in Table I, as well as in the tables to follow.*

Table I. Comparison of Devolunteer Reasons Given by Qualified and Non-Qualified Personnel

Category	N = 32		N = 69		Significance Level	Total	
	Qualified (SS)	% <sup>a</sup>	Non-Qualified (SS)	%		Number	%
A. Motivational Deficiencies	4	12.5	22	31.9	.05-10	26	18
B. Dangers of Sub Duty	11	34.4	5	7.2	.01	16	11
C. Habitability	3	9.4	31	44.9	.01	34	23
D. Workload	0	0.0	2	2.9	Non Sig	2	1
E. Maladjustment Symptoms	8	25.0	19	27.5	Non Sig	27	18
F. Attitudes (Nuclear Power)	3	6.3	0	0	Non Sig	2	1
G. Non-Sub Interests	0	0	2	2.9	Non Sig	2	1
H. Family Problems	11	34.4	9	13.0	.01-.05	20	14
I. Deployment	1	3.1	1	1.4	Non Sig	2	1
J. Status Incongruity	2	6.3	3	4.3	Non Sig	5	4
K. Interpersonal Problems	1	3.1	4	5.8	Non Sig	5	4
L. Pacifist Attitudes	0	0.0	4	5.8	Non Sig	4	3
M. Other	0	0.0	2	2.9	Non Sig	2	1
TOTAL	43		104			147	

- Percentages sum to more than 100% since some men listed a multiplicity of reasons.
- Test of significance is the proportions test from Tate and Clelland (1957).
- Non-significance, i.e., nul probability greater than 10%.



(H) and maladjustive symptoms (E) account for more than 90% of the reasons for SS-designated men's devolunteering while less than 50% of the non-qualified devolunteers list these three categories. Instead, most non-quals indicate that the annoyance and inconveniences of the submarine environment (C) are the most frequently involved in devolunteering, while motivational deficiencies (A) and maladjustive trends (E) are listed as major reasons by about 30%.

Apparently the men who devolunteer prior to qualification do so presumably because of annoying habitability conditions (C) which may be causal for, or at least related to, the presence of exaggerated emotional and other maladjustive trends (E). On the other hand, once the man becomes qualified SS, the likelihood of his becoming somewhat fearful or at least apprehensive about the hazards of the submarine duty increases. Moreover, since the men designated SS tended to be older and consequently were more likely to be married with family obligations, it was not surprising that problems related to family relationships were important factors in the submariner's decision to leave the branch of the service.

While failing to reach the 5% significance level for reliability of differences between the two distributions in Table I, there are some trends quite probably worth noting. For example, category F (Attitudes toward Nuclear Powered Program) is apparently implicated in 6% of the qualified "devolunteers" and tends to support a commonly-held notion that attitudes toward the nuclear program are

somewhat unfavorable. Interestingly, the difficult duty schedules imposed particularly during outfitting and overhaul periods, do not appear to be a significant consideration in the devolunteering of either the qualified or non-qualified groups in Table I (Category D, Workload). Also, there is a slight tendency for more of the "non-quals" to give Interpersonal Problems (K) and the presence of Pacifist Attitude (L) as being involved in devolunteering as compared to those with the SS designator. If upon replication of this study using a larger sample these trends reappear, one would expect in the case of categories K and L at least that these reasons for devolunteering represent the rationalizations and projections of the inexperienced candidate, since they tend to occur more frequently in the non-SS group.

#### Comparison of the Motivational Patterns of Nuclear and Diesel Submarine Crewmembers

As stated earlier, the sample of 101 "devolunteers" was approximately equally divided between the nuclear and diesel submarines. A comparison of the "devolunteer" patterns for these two groups is presented in Table II.

At the outset the only two significant differences suggest that enlisted men devolunteer mainly because of Habitability (C) considerations, while nuclear personnel devolunteer most frequently because of family problems, Category H. Again, as mentioned earlier, the latter finding in a sense is artifactual, since more of the nuclear crews are married, have been in the service longer, and have

Table II. Devolunteer Reasons for Nuclear and Diesel Submariners

Category	N = 45 Diesel	%	N = 56 Nuclear	%	Significance Level*
A. Motivational Deficiencies	16	35.6	10	17.9	Non Sig.
B. Dangers of Sub Duty	6	13.3	10	17.9	Non Sig.
C. Habitability	23	51.1	11	19.6	.01
D. Workload	1	2.2	1	1.8	Non Sig.
E. Maladjustment Symptoms	11	24.4	16	28.6	Non Sig.
F. Attitudes (Nuclear Power)	0	0.0	2	3.6	Non Sig.
G. Non-Sub Interests	1	2.2	1	1.8	Non Sig.
H. Family Problems	1	2.2	19	33.9	.01
I. Deployment	1	2.2	2	1.8	Non Sig.
J. Status Incongruity	3	6.7	2	3.6	Non Sig.
K. Interpersonal Problems	2	4.4	3	5.4	Non Sig.
L. Pacifist Attitudes	2	4.4	2	3.6	Non Sig.
M. Other	1	2.2	1	1.8	Non Sig.

\*Test of significance is the proportions test from Tate and Clelland. (1957)

larger families, --a series of facts conducive to more "family problems." Similarly, the smaller, less well-engineered, diesel submarine might be expected to generate more habitability problems (C). Still, it is interesting to note that 20% of the men billeted in the more spacious and comfortable nuclear submarines still give habitability as one reason for devolunteering. A near-significant trend suggests that Motivational Deficiencies (A) are given by twice the number of diesel personnel as by nuclear men. This finding in the context of no-differences between the two groups in terms of deployment schedules (1), interest or status conflicts or in attitude patterns (G, J, and L in the same order), argue that the difference in the length and nature of the operational missions and in the crew compositions of the two classes of submarines may not be a major factor in the motivation to devolunteer. Noteworthy, also, is the fact that approximately equal proportions of the devolunteers from both submarine classes (about 25%) involve maladjustive symptomatology of some kind. Possibly indicated are improved psychiatric screening or possibly, some modification of the submarine environmental situation as a means of preventing the appearance or alleviation of maladjustive trends under operational conditions.

#### Paygrade Comparisons

A plausible assumption would seem to be that the motivation underlying devolunteering by chief, 1st, and 2nd class petty officers would differ

remarkably from the patterns for 3rd class and non-rated enlisted men. Table III presents data bearing on this comparison.

The similarity between the percentage distributions for nuclear and diesel submariners in Table II and the two distributions by paygrade groupings depicted in Table III are immediately apparent. This is true because of the well known fact that the paygrade distributions of nuclear crews are systematically higher than are those of the diesel submarine. There is one notable difference between the distributions in Tables II and III, namely, three times as many of the E-5/E-7 group indicate that the dangers of submarine duty (B) was a major factor in their devolunteering. Why does this, seemingly paradoxical, difference occur? There are several possible reasons.

First of all, we note that category B was more frequently mentioned by qualified submariners (Table I). This suggests that after a candidate meets the knowledge requirements, a significant proportion develop apprehensions regarding the safety of the submarine, this concern contributing to their decision to devolunteer. The same general conclusion is supported by the significant difference in favor of the higher rated group for category B in Table III. Secondly, the fact that more than 13 classes of motives for devolunteering were found in the present sample indicates that fear or apprehension about submarine duty constitutes only a part

Table III. Paygrade

Category	N = 60 E-1 to E-4	%	N = 41 E-5 to E-7	%	Significance Level*
A. Motivational Deficiencies	20	33.3	6	14.6	Non Sig.
B. Dangers of Sub Duty	5	8.3	11	26.8	.05
C. Habitability	27	45.0	7	17.1	.01
D. Workload	1	1.7	1	2.4	Non Sig.
E. Maladjustment Symptoms	16	26.7	11	26.8	Non Sig.
F. Attitudes (Nuclear Power)	0	0.0	2	4.9	Non Sig.
G. Non-Sub Interests	2	3.3	0	0.0	Non Sig.
H. Family Problems	6	10.0	14	34.1	.01
I. Deployment	0	0.0	2	4.9	Non Sig.
J. Status Incongruity	2	3.3	3	7.3	Non Sig.
K. Interpersonal Problems	2	3.3	3	7.3	Non Sig.
L. Pacifist Attitudes	4	6.7	0	0.0	Non Sig.
M. Other	2	3.3	0	0.0	Non Sig.

\*Test of significance is the proportions test from Tate and Clelland, (1957)

answer to the dynamics of devolunteering. Secondly, the higher rated group which is older, has been in the Navy longer and which has a higher proportion with marital responsibility may tend to project, rationalize, and displace some of their concern regarding their own and their family's security onto the submarine situation. Finally, higher rated men have assimilated a large amount of technological knowledge affecting their expectancy or concern regarding accidents or casualties.

More than half of the "devols" in lower paygrades apparently devolunteered because of habitability conditions (category C in Table III). On the other hand, fewer of this group, as expected, gave family problems as being involved in their devolunteering (H). Again, similar to the data in Table II, approximately equal proportions (about one quarter) of both groups had some maladjustive symptomatology (E) as an apparent contributing factor to their decision to devolunteer.

## DISCUSSION OF RESULTS

Across the total sample of 101 enlisted men who devolunteered during the 1968-1970 period, the five most often indicated motivational classes were: (in descending order of incidence) Habitability, Maladjustive Symptoms, Motivational Deficiencies, Family Problems, and Dangers of Submarine Duty (C, E, A, H, B in Table I). For the devolunteer assigned to the diesel fleet, habitability factors such as confinement, lack of privacy and the like were most frequently listed as major reasons for leaving the submarine

service. These same men who were also younger and who, as a whole, tended not to have attained as high a paygrade level, appeared frequently to have devolunteered because of insufficient or inappropriate motivation for this branch of the service. On the other hand, those men who had attained E-5 or higher and were qualified (SS) appeared to have devolunteered largely for two major reasons; first, because of family-related problems and secondly because of the hazards of submarine duty. Since this high-rated group of qualified submariners were older and had been on active duty longer than the remainder of the present sample, it follows that disproportionately more were married, thus accounting for a higher incidence of "family problems" involved in the devolunteer decision.

But the second most frequently stated reason for devolunteering given by the high-rated SS-qualified men, namely, concern about the dangers of submarine duty is not as readily explained (Table I). Earlier in this paper this paradoxical finding was tentatively explained as a result of rather narrow specialization trends within the various submariner ratings. For example, each of the WW-II diesel submariners in order to qualify must have demonstrated a working knowledge of most of the systems used to navigate and maintain the ship and to fire its torpedoes. In contrast, the present-day rated submariner must demonstrate a comprehensive knowledge in his rating but is required to have only a superficial, rather general familiarity with most of the remaining systems. For example, a fire control technician (FT),



E-5 or higher, must have detailed knowledge and skills necessary to operate, maintain and repair fire control radars and electronic fire control circuits of various kinds, but may have little knowledge or skills having to do with navigation technology as QM ratings would have. This is a modern day example of the age-old proverb "a little knowledge can be dangerous," which may be an inevitable consequence of the spectacular increase in technological requirements for submariners called upon to operate and maintain increasingly complex equipment.

Possibly, a more straight forward explanation of the fact that significantly fewer of the non-qualified men (as compared to SS (Submarine qualified) personnel) devolunteer because of the dangers of submarine duty may be the naivete of this group insofar as knowledge of the nature of submarine operations is concerned. That is to say, these inexperienced men may have insufficient knowledge of submarine technology to recognize the hazards involved. Accordingly, they do not become excessively fearful.

Across all of the subgroupings of the total sample, category E (Tables I, II, and III), Maladjustive Symptoms remained relatively constant, namely 24-28%. Whereas the detailed data necessary to delineate the specific nature of the symptomatology were not available in the present study, it appears that fear, anxiety, and in some rare instances, phobia, more or less associated with the confinement, water depth, and atmospheric conditions were the most frequently occurring emotional

symptoms describing this devolunteer subgroup.

To a limited extent these data provide some tentative suggestions as to possible procedures whereby the incidence of devolunteering may be reduced. First, for the non-qualified men, any means by which the habitability of the submarine may be improved may be helpful. For example, in the mid-fifties a survey was conducted with the crew of NAUTILUS (SSN-571) to identify some of the major sources of annoyance (Weybrew, 1957). Such factors as working hours, paygrade and rating distributions, and deployment schedules were mentioned as problem areas at that time. Whereas, at the time the above survey was conducted, few habitability factors, as such, were mentioned in conjunction with NAUTILUS, it seems likely a similar survey conducted with the crews of the present-day fleet would pinpoint some of the aspects of the submarine environment which contribute to the submariner's decision to devolunteer. Incidentally, similar results were reported in an Air Force study completed in the mid-sixties (Cantrell, Lewis, and Bryce, 1966). Secondly, for the nuclear submariner in particular, improved housing, more predictable (and possibly shorter) periods of deployment, enhanced educational opportunities or any incentive which might improve the integrity of the submariner's family situation, might likewise improve the retention "picture" significantly (Category H). Finally, improvement of the psychiatric screening procedures for volunteers coming into this branch of the service might

materially reduce the number of men devolunteering because of the development of maladjustive trends (Category E in Tables I, II, and III) including stated fear or apprehension concerning the hazard aspects of the submarine (Category B).

Taken together, these measures, if implemented, might result in a reduction in the number of men devolunteering subsequent to their graduation from Submarine School. This reduction in devolunteer rate could in turn bring about a considerable savings in trained manpower and dollar resources over the long run.

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